

# A NEW KEY TO THE SUBFAMILIES OF THE NEARCTIC STAPHYLINIDAE AND NOTES ON THEIR CLASSIFICATION

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American coleopterists often express the view that the Staphylinidae is a difficult family to study. Although the average small size and the numerous species contribute to the problems of identification, a more formidable obstacle is the present state of the classification.

The family has been divided into a number of subfamilies which are intended to reflect the phylogenetic relationships of their members. Some of these subfamilies cannot be defined on the basis of one or several distinctive characters. This has resulted in keys to the subfamilies which are unusable. However, some of the subfamilies have been divided into tribes which are easy to define.

At the present stage of the knowledge of the family, the most pressing problem is that of identification. With this fact in mind, with a view toward simplification, I have treated some of the groups usually considered tribes as subfamilies. Having done this, I have found it possible to construct what I consider to be a usable key to the subfamilies of the Nearctic Staphylinidae based on characters which are generally visible in ordinary museum specimens.

Some of the characters in the new key have not been previously employed. The most important of these is that given in couplet eighteen, which separates the subfamilies near Staphilininae from those near Tachyporinae by the presence or absence of a distinct neck. The only case where application of this character might be considered doubtful is in Platyprosopinae. Although in members of that subfamily the head is only slightly narrowed behind the eyes, there usually is a distinct nuchal constriction across the dorsal surface with the sides of the head continuing behind the constriction, more or less parallel to each other. Thus, a true but broad neck does occur.

## KEY TO THE SUBFAMILIES OF THE NEARCTIC STAPHYLINIDAE

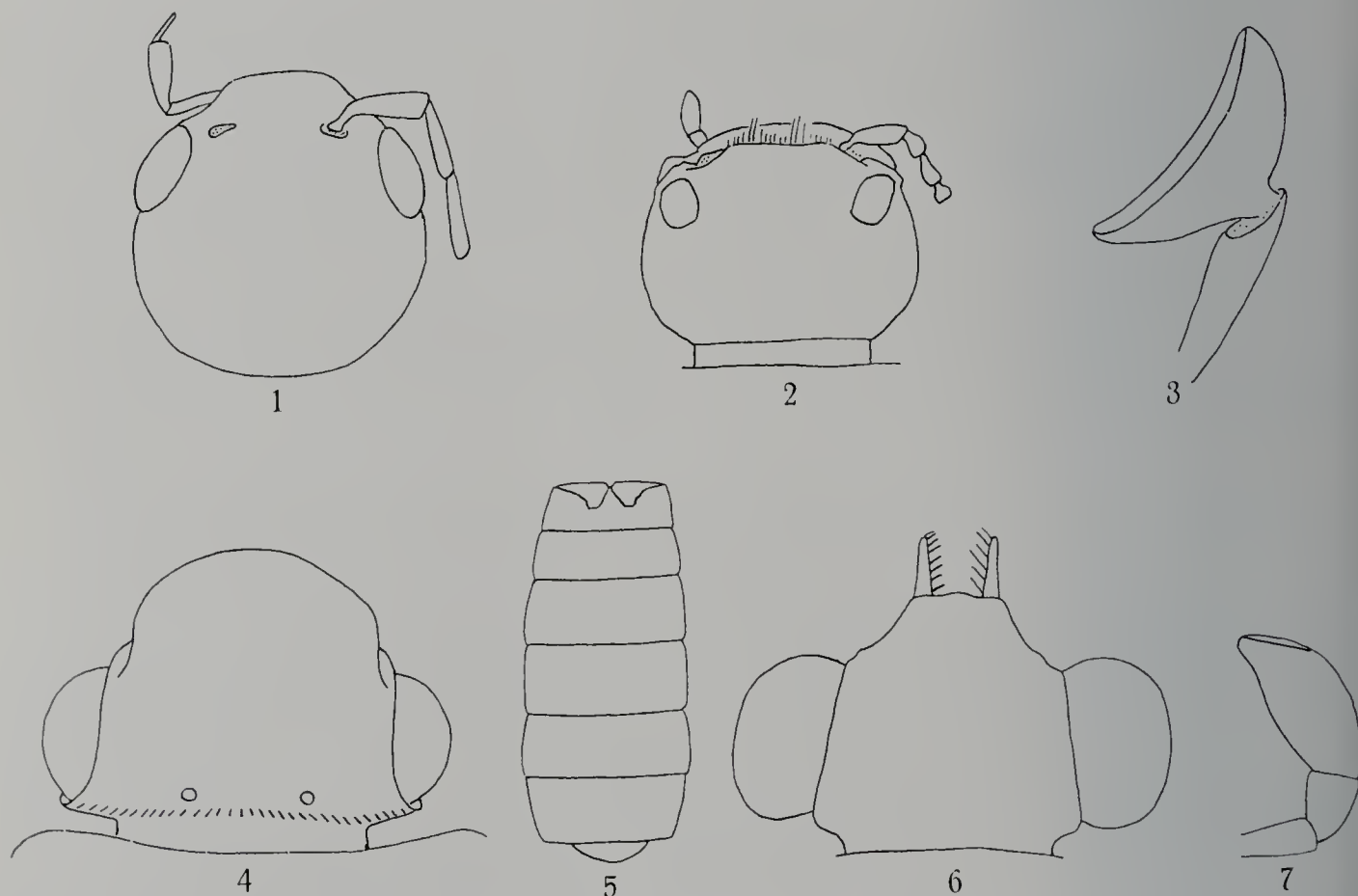
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|----|--|---------------|
| 1. | Antennae inserted on surface of head between anterior margins of eyes; last segment of maxillary palpus subulate (fig. 1)----- | 2             |
|    | Antennae inserted at front or side margins of head (fig. 2)-----   | 3             |
| 2. | Posterior coxae small, separated-----  | STENINAE      |
|    | Posterior coxae large, contiguous-----   | ALEOCHARINAE  |
| 3. | Antennae 9-segmented; posterior coxae separated-----   | MICROPEPLINAE |
|    | Antennae 10- or 11-segmented; posterior coxae contiguous-----  | 4             |
| 4. | Last segment of labial palpus large, semilunar (fig. 3)-----   | OXYPORINAE    |
|    | Last segment of labial palpus not semilunar-----   | 5             |
| 5. | Head with a pair of frontal calluses ("ocelli") <sup>2</sup> between the posterior margins of the eyes (fig. 4)-----           | 6             |
|    | Head without frontal calluses-----   | 7             |

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|-----|--|-----------------|
| 6.  | Tarsi 5-segmented -----  | OMALIINAE       |
|     | Tarsi 2- or 3-segmented-----   | LEPTOTYPHLINAE  |
| 7.  | Abdomen with complete second sternite <sup>3</sup> (seven sternites can be counted) (fig. 5)---  | OXYTELINAE      |
|     | Second abdominal sternite absent or rudimentary (six complete sternites can be counted) -----  | 8               |
| 8.  | Anterior margin of labrum with two long processes which are setose within (fig. 6)   | MEGALOPSIDIINAE |
|     | Labrum without such processes-----   | 9               |
| 9.  | Antennae 10-segmented -----  | HYPOCYPHTINAE   |
|     | Antennae 11-segmented -----  | 10              |
| 10. | Last segment of maxillary palpus longer than penultimate, slightly arcuate, with an oblique, elongated, concave truncation of distinctive texture at apex (fig. 7) | PINOPHILINAE    |
|     | Last segment of maxillary palpus not so formed-----  | 11              |
| 11. | Metasternum with expanded plates covering part of femora-----  | TRICHOPSENIINAE |
|     | Metasternum without such plates; femora exposed-----   | 12              |
| 12. | Anterior tarsi 4-segmented (in the Nearctic species)-----  | EUAESTHETINAE   |
|     | Anterior tarsi 5-segmented-----  | 13              |
| 13. | Abdomen without paratergites (without double margin) (fig. 8)-----   | 14              |
|     | Abdomen with paratergites (with prominent double lateral margin) (fig. 10)-----  | 15              |

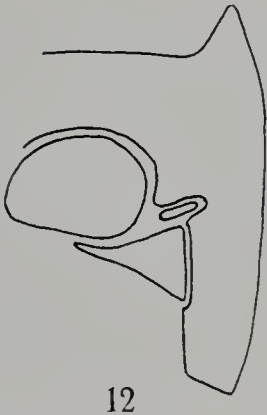
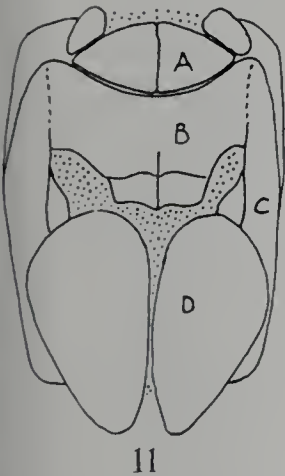
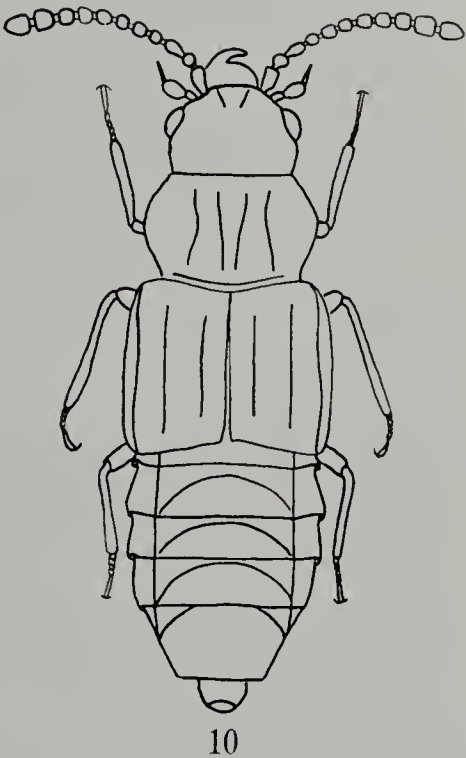
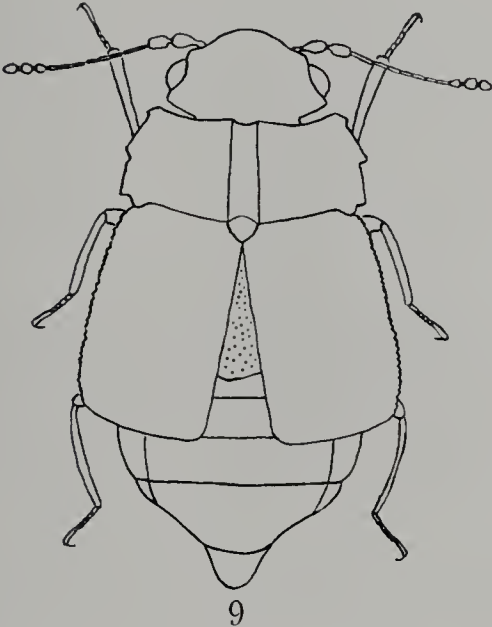
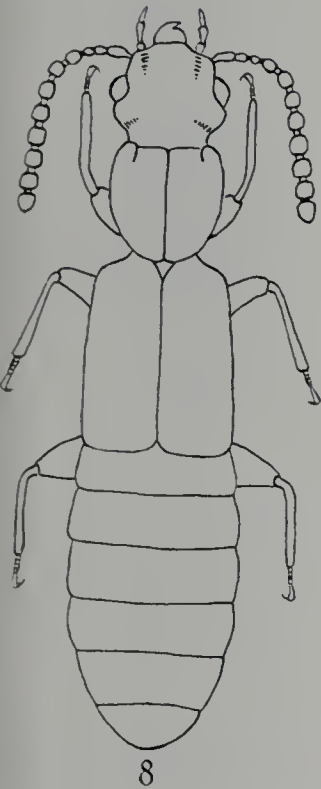
<sup>2</sup> Except *Vellica longipennis* Casey, which will go to Pteroniinae in this key. *Vellica longipennis*, a member of the Omaliinae, can be distinguished from members of the Pteroniinae by the presence of a strong fovea at each side of the pronotum.

<sup>3</sup> In some specimens of certain species of the Coprophilini (particularly in *Syntomium* spp.) the second abdominal sternite is rudimentary. I have been unable to find a satisfactory substitute for this character.



FIGURES 1-7. 1—*Falagria laeviuscula* LeConte, head, dorsal view. 2—*Hadrotes crassus* LeConte, head, dorsal view. 3—*Oxyporus vittatus* Gravenhorst, apex of labial palpus. 4—*Acidota subcarinata* Erichson, head, dorsal view. 5—*Bledius fenyessi* Bernhauer and Schubert, abdomen, ventral view. 6—*Megalopinus* sp., head, dorsal view. 7—*Pinophilus testaceus* Erichson, apex of maxillary palpus.

14. Anterior coxae small, globular, without a transverse or diagonal sulcus on anterior face -----LISPININAE
- Anterior coxae large, elongate, with a transverse or diagonal sulcus on anterior face -----OSORIINAE
15. Anterior coxae small, globular-----PIESTINAE
- Anterior coxae large, elongate-----16
16. Elytra long, completely covering first tergite (fig. 9)-----PTERONIINAE
- Elytra not completely covering first tergite-----17
17. Each basal abdominal tergite with a diagonal impressed line from near the middle front margin to each apical angle; pronotum and elytra costate (fig. 10)-----PSEUDOPSIDIINAE
- Abdomen without such lines-----18
18. Head constricted behind eyes to form a distinct neck that is clearly visible from above 19
- Sides of head converging uninterruptedly to base, not constricted to form a neck that is clearly visible from above-----25



FIGURES 8-13. 8—*Eumalus nigrellus* (LeConte), dorsal view. 9—*Megarthus pictus* Motschoulsky, dorsal view. 10—*Pseudopsis obliterata* LeConte, dorsal view. 11—*Hyponygrus emmesus* (Gravenhorst), prothorax, ventral view, A. neck plate, B. prosternum, C. hypomeron, D. coxa. 12—*Olisthaerus substriatus* Gyllenhal, half of prothorax, ventral view. 13—*Tachinus fimbriatus* Gravenhorst, half of prothorax, ventral view.



19. Small sclerite (neck plate) present at anterior margin of prosternum (fig. 11)-----XANTHOLININAE  
----- 20  
Neck plate absent ----- 20
20. Last segment of maxillary palpus less than one-half as long as penultimate, usually  
little longer than width of penultimate, usually subulate or papiliform----- 21  
Last segment of maxillary palpus at least one-half as long as penultimate, subulate  
only in *Heterothops*----- 22
21. Antennal fossae closer to mandibular fossae than to each other-----PAEDERINAE  
Antennal fossae about as close to each other as to mandibular fossae-----DIOCHINAE
22. Anterior angles of pronotum produced anteriorly beyond anterior lateral angles of  
prosternum; margin of pronotum apparently single, hypomera not or incompletely  
margined along inner side-----QUEDIINAE  
Anterior angles of pronotum not so produced; margin of pronotum double, hypomera  
completely margined along inner side----- 23
23. Lateral marginal lines of pronotum separate throughout-----XANTHOPYGINAE  
Lateral marginal lines of pronotum united behind anterior angles----- 24
24. Antennal fossae closer to eyes than to each other-----STAPHYLININAE  
Antennal fossae closer to each other than to eyes-----PLATYPROSOPINAE
25. Antennae with third through eleventh segments filamentous----- 26  
Antennae not filamentous----- 27
26. Anterior tarsi very slender-----HABROCERINAE  
Anterior tarsi broadly dilated-----TRICHOPHYINAE
27. Elytral epipleura delimited by a carina----- 28  
Elytral epipleura not delimited by a carina-----PHLOEOCHARINAE
28. Prosternal epimera delimited by a distinct suture (fig. 12)-----OLISTHAERINAE  
Prosternal epimera fused to hypomera without a suture (fig. 13)-----TACHYPORINAE

### DISCUSSION OF SUBFAMILIES

Although keys are very useful tools for identification, because of their structure they cannot always indicate that certain characters are unique within a group. For this reason and because many of the subfamilies in the above key have a status different from recent usage, a short discussion of each subfamily follows.

*Steninae*. Two genera, one very large, are included in this subfamily. The species, rather monotonously similar in appearance, are easily recognized by the large eyes and rough sculpture.

*Aleocharinae*. This subfamily contains at least two-fifths of all the species in the family. This group, much in need of study, is very difficult. There are a large number of poorly defined genera, some of which contain hundreds of described species. The character of placement of the antennal fossae, as stated in couplet one, used to separate this subfamily and *Steninae* from the other staphylinids, is not entirely satisfactory. In many forms the fossae are situated fairly near the front margin, but are usually removed by at least the diameter of the fossae. The subulate fourth segment of the maxillary palpi, although not unique in the family, will aid in recognition of members of this group.

*Micropeplinae*. Members of the *Micropeplinae* can be distinguished from all other staphylinids by their nine-segmented antennae and by the fact that the undersurface of the head and pronotum is grooved for the reception of these organs. The posterior coxae are well separated, a character shared only with the *Steninae*. There are two genera with few species.

This group has at various times been ranked as a separate family. Its

members, however, appear to be more closely allied to the Staphylinidae than to any other family. This is particularly evident in their strongly chitinized abdominal tergites. Unless it can be demonstrated that their nearest relatives are other than the staphylinids, it seems better to retain them as a subfamily than to create a separate family merely because of their somewhat aberrant nature.

*Oxyporinae*. The large, semilunar segment of the labial palpi is unique in the family. The few species of the single Nearctic genus are found on fungus.

*Omaliinae*. Members of the Omaliinae and those of the Leptotyphlinae are the only staphylinids with a pair of pale mounds on the surface of the head. These mounds have generally been called *ocelli*. Coiffait, 1959, demonstrated that these structures are not true ocelli and proposed the name *frontal calluses* for them. The subfamily is large, with many genera requiring close observation for their identification.

*Leptotyphlinae*. These minute, slender, pale insects are found in the soil. Many species are known from Europe, but it was not until 1959 that Coiffait described *Neoleptotyphlus californicus* from the redwood forest of the California coast. Several other species are now being studied by him.

*Oxytelinae*. This, one of the larger subfamilies, is unique in the presence of a complete second sternite. In a few species this sternite is sometimes rudimentary.

*Megalopsidiinae*. This is a small subfamily whose members can easily be recognized by their enormous eyes and shining integuments. The processes of the labrum readily separate them from other staphylinids.

*Hypocyphinae*. There are only two genera with a total of five known species in North America. These were formerly placed with the Tachyporinae because of their fusiform bodies, but have been removed on account of their ten-segmented antennae, a character found elsewhere in this family only in a few of the aleocharinds.

*Pinophilinae*. This group has usually been treated as a tribe of the Paederinae, which subfamily, as so constituted, was impossible to define. The Pinophilinae is a fairly large, homogeneous group. The character used in the key concerning the shape of the last segment of the maxillary palpi, although consistent, is not always pronounced. Only a few species of this predominantly tropical group enter the Nearctic region.

*Lispinae*. Because of their small anterior coxae and often depressed form, members of this subfamily have usually been associated with the Piestinae. Blackwelder, 1942, treated them as a tribe of the Osoriinae because of their unmargined abdomens. The above characters are partly adaptive and seem in this case to be adaptations to a subcortical habitat. The unmargined abdomen has evolved in varying degrees in many staphylinids as a modification useful in a number of different environments. Because the Lispinae and Osoriinae seem not to be closely allied, I have treated each as a separate subfamily. Members of the Lispinae are easily known by the combination of their small anterior coxae and unmargined



abdomens. There are only six known Nearctic genera, with relatively few species included in each.

*Osoriinae*. Members of this subfamily are easily recognized by their large, exserted anterior coxae and unmarginated abdomens. They are usually cylindrical in form. Only a few Nearctic species are known from the three genera represented in this region.

*Piestinae*. Most students have included in this group all staphylinids with small anterior coxae. Blackwelder, 1942, reduced the size of the subfamily by removing those species in which the abdomen lacks paratergites. Moore, 1963, added *Zalobius* and *Asemobius*, and presented a new key to the Nearctic genera. Like the *Lispinae* and *Osoriinae*, this is largely a tropical group with few Nearctic species.

*Trichopseniinae*. The large plate which covers part of the femur is unique in this subfamily. The two Nearctic genera have only seven species assigned to them.

*Pteroniinae*, NEW NAME. This is the subfamily previously called *Proteininae*. Blackwelder, 1952, stated that "the removal of the name *Proteinus* to the Nitidulidae because of hitherto unrecognized type fixation leaves the genus formerly known as *Proteinus* without a name." He gave it the name *Pteronius*. If this name is to be accepted, the subfamily name must be *Pteroniinae*. Blackwelder's usage has not been followed by all subsequent students, some of whom continue to use *Proteininae*. As I am unable to find any statement of the reasons for rejecting the name *Pteronius*, I am retaining it.

The few species of the two genera included in this subfamily resemble some of the *Omaliinae*, but can be distinguished by the lack of frontal calluses and by their very transverse anterior coxae.

*Euaesthetinae*. As in the preceding subfamily, these small insects possess no single character for their easy recognition. The tarsi are four-segmented in the few Nearctic species, and the eyes are at the base of the head.

*Pseudopsinae*. This subfamily contains the single genus *Pseudopsis*. The four Nearctic species are very generalized in form, having few morphological characters to distinguish them. However, the combination of the strong diagonal impressions of the tergites and the longitudinally carinate pronotum and elytra will readily separate them from other Nearctic staphylinids.

*Xantholininae*. This group has usually been treated as a tribe of the *Staphylininae*, adding greatly to the heterogeneity of that subfamily. As constituted here, it contains only those species with the distinctive neck plates anterior to the prosternum. No other staphylinid has this sclerite. In members of this group, the antennae are always inserted close together at the front margin of the head. The body is long, slender, loosely articulated, and the elytra usually overlapping at the suture. From this group, I have removed *Diachus* and *Ophioomma* to the new subfamily *Diachinae* and *Platyprosopus* to the new subfamily *Platyprosopinae*.

*Paederinae*. This is one of the larger subfamilies, with numerous well-

characterized genera. All the species have the terminal segment of the maxillary palpi less than one-half as long as the penultimate segment and usually either subulate or papillose.

*Diochinae* Moore, NEW SUBFAMILY. This subfamily is based on the genus *Diochus*. It has usually been placed in the Xantholininae because of the rather approximate antennae and because the area ahead of the prosternum shows some chitinization. However, the chitinization of the neck region in no way resembles the sclerite called the neck plate, which is so characteristic of the Xantholininae. Some authors have placed this genus in the Staphylininae, where it seems to be equally out of place. It destroys the homogeneity of either of these groups. The terminal segment of the maxillary palpi is subulate. The single Nearctic species is small and slender, resembling certain species of *Philonthus* in facies.

Judging from the rather inadequate description of *Ophioomma*, it belongs here.

*Quediinae*. This is a large group which has usually been considered a tribe of the Staphylininae. The pronotal disc is usually impunctate, except for a group of three punctures arranged in a small triangle on each side of the center line in front.

*Xanthopyginae*. Usually considered a tribe of the Staphylininae, this group can easily be recognized by the character given in the key. There are six Nearctic genera, each with a single species.

*Staphylininae*. This is the group which has usually been treated as the tribe Staphylinini. There are few Nearctic genera but many species. The group is relatively well known.

*Platyprosopinae* Moore, NEW SUBFAMILY. Several authors, commenting on the genus *Platysprosopus*, have mentioned that it seemed out of place in the Xantholinini. The only important character which members of this genus have in common with those of the Xantholininae is the approximate antennal fossae. A single species is known from Texas in this tropical genus, the only genus in the subfamily.

*Habrocerinae*. Members of the single genus *Habrocerus* resemble tachyporinids in facies, but differ as indicated in the key. There are few known species.

*Trichophyinae*. The few species are similar to *Habrocerus* in facies.

*Phloeocharinae*. The only known Nearctic representative of this subfamily is a single species of *Ecbletus* which has been found in California (in press). *Olisthaerus* has sometimes been included here, but in no way resembles members of this subfamily except that the species are equally generalized in structure.

*Olisthaerinae*. Two circumpolar species of *Olisthaerus* constitute this subfamily.

*Tachyporinae*. This is one of the larger subfamilies. The species are usually fusiform in shape, compact in build and are without a neck, the small head being often only partly visible from above.



## NOTES OF PHYLOGENY

The above key is meant to be strictly an aid to identification. Some of its primary subdivisions appear to have little relation to phylogeny. Knowledge of the family has not yet reached a point where definite conclusions regarding phylogeny can be stated. However, some speculation is not out of place at present.

Renaud Paulian, 1941, suggested a major change in the classification of the Staphilinoidea, the result of a detailed study of the larvae of a large number of species. His suggestions have not been followed by subsequent students. Paulian split the group into two major subdivisions which he called the Staphylinomorphs and the Aleocharinmorphs. He called attention to the primitive nature of the Staphylinomorphs. Paulian presented the following key to the larvae of the two groups.

Galea of the maxilla present, movable, with the aspect of a segment; lacina reduced at the maximum to some localized bristles in the apical region of the stipes; cephalization accentuated, neck present, epicranial suture extremely long; chitination of the prosternum well developed; gular sutures very long; ocelli assembled in a group at the base of the antennae; nasale present. Anal vesicles provided with numerous small terminal curved spines; maxillary palpi of four segments-----

-----STAPHYLINOMORPHS

Galea of maxilla absent or represented by a simple lobe bearing a fringe, single or double or triple, located in the apical region of the lacina which is always well developed; cephalization generally very feeble, neck absent, epicranial suture variably long; prosternal chitination usually reduced; gular sutures almost always absent; ocelli of variable distribution. Anal vesicles generally without small curved spines, sometimes with four large curved spines. Maxillary palpi variable, of three or four segments. Labrum present or united to epicranium in a nasale--

-----ALEOCHARINOMORPHS

I believe that, as applied to the Staphylinidae, this is a very important division and have so arranged the subfamilies. As the Staphylinomorphs are considered more primitive, they are placed first. Although this distinction appears to indicate very satisfactorily the relation of the Staphylinomorphs to other members of the family, it leaves in the Aleocharinmorphs a group of subfamilies which is diverse, the relationships between them not being expressed. Much more information is needed before these can be adequately grouped.

## Suggested arrangement of the subfamilies

## STAPHYLINOMORPHS

1. Staphylininae
2. Xanthopyginae
3. Quediinae
4. Diochinae
5. Platyprosopinae
6. Xantholininae
7. Paederinae
8. Pinophilinae



## ALEOCHARINOMORPHS

9. Micropeplinae
10. Pseudopsinae
11. Piestinae
12. Lispinae
13. Osoriinae
14. Pteroniinae
15. Omaliinae
16. Oxytelinae
17. Oxyporinae
18. Megalopsidiinae
19. Euaesthetinae
20. Leptotyphlinae
21. Phloeocharinae
22. Olisthaerinae
23. Tachyporinae
24. Habrocerinae
25. Trichophyinae
26. Trichopseniinae
27. Hypocyphtinae
28. Steninae
29. Aleocharinae

## LITERATURE CITED

BLACKWELDER, RICHARD E.

1942. Notes on the classification of the staphylinid beetles of the groups Lispini and Osorinae. *Proc. United States Nat. Mus.* 92:75-90.
1952. The generic names of the beetle family Staphylinidae with an essay on genotypy. *Bull. United States Nat. Mus.* 200:i-iv, 1-483.

COIFFAIT, HENRI

1959. Monographie de Leptotyphlites (Col. Staphylinidae). *Rev. Fran. Ent.* 26:237-437, 808 figs.

MOORE, IAN

1963. Removal of *Zalobius* and *Asemobius* to the Piestinae (Coleoptera: Staphylinidae). *Coleopt. Bull.* 17:47-48.

PAULIAN, RENAUD

1941. Les premier états des Staphylinoidea. Étude de morphologie comparée. *Mém. Mus. Nat. Hist. (Paris)*, n.s. 15:1-361, 1365 figs., 3 pls.